

$$f(f(\frac{\pi}{2})) = ? \rightarrow \cot \frac{\pi}{2} = \frac{\sqrt{3}}{\frac{1}{\sqrt{3}}} = \sqrt{3} \rightarrow \sqrt{3+1} = (2) \quad (1)$$

$$\text{الف) } f(g(\frac{\pi}{3})) = \rightarrow g(\frac{\pi}{3}) = 2 \cos^2 \frac{\pi}{3} = (\frac{1}{2}) \rightarrow f(\frac{1}{2}) = f(r) = \sqrt{\frac{r-1}{r}} = (\frac{\sqrt{3}}{2}) \quad (2)$$

$$\text{ب) } f(x\sqrt{2}) \rightarrow \left[\frac{\sqrt{2}}{1-\sqrt{2}} \right] = \left[\frac{1,4}{1-1,4} \right] = \left[\frac{1,4}{-0,4} \right] \approx [-3,5] = (-4) \quad (3)$$

$$g(f(\frac{\pi}{2})) \rightarrow \sin \frac{\pi}{2} = \frac{\sqrt{2}}{2} \rightarrow \frac{\sqrt{2}}{2} \times \sqrt{\frac{1-\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}}} = \frac{2}{2} = (\frac{1}{2}) \quad (4)$$

$$\begin{aligned} \text{الف) } & \left. \begin{array}{l} 4 \rightarrow 6 \rightarrow 5 \\ 2 \rightarrow 4 \rightarrow 5 \\ 6 \rightarrow 8 \rightarrow 12 \\ 8 \rightarrow 10 \rightarrow 12 \end{array} \right\} f_{og}(x) = \{(4,5), (2,5), (6,12), (8,12)\} \quad \text{ب) } g \circ f(x) = \emptyset \quad \text{د) } g \circ g(x) = \{(2,6), (4,8), (6,10)\} \\ & \text{ج) } f \circ f(x) = \emptyset \end{aligned} \quad (5)$$

$$f_{og}(x) \rightarrow a \rightarrow 3 \rightarrow 2 \Rightarrow \boxed{a=4} \quad g \circ f(x) : 4 \rightarrow (5) \rightarrow 1 \Rightarrow \boxed{b=5} \Rightarrow (4,5) \quad (6)$$

$$\begin{aligned} f, g \rightarrow ax+b \rightarrow f(x) &= a(ax+b)+b = a^2x+ab+b = 4x+3 \quad \left\{ \begin{array}{l} a=-2/b=-3 \rightarrow -2x-3 \\ a=2/b=1 \rightarrow 2x+1 \end{array} \right. \quad (7) \\ f(x)+3=-1 \Rightarrow f(x)=-4 \Rightarrow x=-2 \Rightarrow (x-2)-2 = (-4) \quad -6+7=1 \end{aligned}$$

$$g \circ f(x) = \frac{1}{|x+|x|| - \sqrt{x+|x|}} \Rightarrow \text{مخرج برای هر عدد مثبتی ای، 0 و عدد 1 برابر صفر می شود} \quad 15 - \sqrt{15} = 0 \Rightarrow D_{g \circ f} = (0, +\infty) - \{1\} \quad (8)$$

$$\begin{aligned} D_g &= [0, +\infty) / D_f = [-1, 1] \quad \frac{-1}{-1} + \frac{1}{1} \Rightarrow \{x \in D_f : f(x) \in D_g\} \\ D_{f \circ g} &= D_f \cap D_g = [0, 1] \Rightarrow \{[-1, 1] \cap 0 \leq \sqrt{1-x^2} \leq 1\} = [-1, 1] = D_{(f \circ g) \neq \emptyset} \\ & \quad \begin{array}{l} 1-x^2 \leq 1 \Rightarrow 0 \leq x^2 \Rightarrow \mathbb{R} \\ 1-x^2 \geq 0 \Rightarrow 1 \geq x^2 \Rightarrow [-1, 1] \end{array} \end{aligned} \quad (9)$$

$$\begin{aligned} \text{الف) } \frac{x^2x+1}{x-2} &= f \rightarrow 3x+1 = xt-2t \Rightarrow x(r-t) = -1-2t \Rightarrow x = \frac{-1-2t}{r-t} \Rightarrow f(x) = \frac{r(-1-2t)}{r-t} + 5 = \frac{-r-2rt+5r-5t}{r-t} \\ & \quad \Rightarrow \frac{-13t+11}{-t+r} = f(x) \\ \text{ب) } x + \frac{1}{x} &= t \Rightarrow t^2 = x^2 + \frac{1}{x^2} + 2(x + \frac{1}{x}) = t^2 - 2t = f(x) = \frac{-13x+1}{-x+3} \end{aligned} \quad (10)$$

$$\left. \begin{array}{l} g(\sqrt{x}) = 0 \\ g(1) = 0 \end{array} \right\} g(f(x)) \Rightarrow \left. \begin{array}{l} f(x) = \sqrt{x} \Rightarrow \boxed{x=2} \\ f(x) = 1 \Rightarrow \boxed{x=1} \end{array} \right\} |2-1| = \textcircled{1}$$

①.

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